

What is claimed is:

1. An image signal cancel-type heterodyne reception method comprising the steps of:

mixing a high-frequency signal received by an antenna etc. and amplified with locally oscillated two-phase output signals of a first local oscillator which have different phases, to generate two-phase intermediate-frequency signals;

summing a pair of modulated signals of the two-phase intermediate-frequency signals which are modulated using two modulating orthogonal signals which are orthogonal to each other, to generate one synthesized signal;

amplifying the synthesized signal to generate an intermediate-frequency amplifier output signal; and

modulating the each intermediate-frequency amplifier output signal by using the modulating orthogonal signals and mixing them with locally oscillated two-phase output signals of a second local oscillator which have different phases, to generate desired base-band signals from which image signals have been canceled, thus demodulating the base-band signals.

2. The image signal cancel-type heterodyne reception method according to claim 1, wherein signals of two frequency

bands which act as an image signal to each other are received simultaneously.

3. An image signal cancel-type heterodyne reception method comprising the steps of:

mixing a high-frequency signal received by an antenna etc. and amplified with locally oscillated two-phase output signals of a first local oscillator which have different phases, to generate two-phase intermediate-frequency signals;

summing a pair of modulated signals of the two-phase intermediate-frequency signals which are modulated using two modulating orthogonal signals which are orthogonal to each other, to generate one synthesized signal;

amplifying the synthesized signal to generate an intermediate-frequency amplifier output signal; and

modulating the intermediate-frequency amplifier output signal by using signals obtained by modulating two-phase output signals of a second local oscillator which have different phases by using the modulating orthogonal signals, to generate a desired base-band signal from which an image signal has been canceled, thus demodulating the base-band signal.

4. The image signal cancel-type heterodyne reception method according to claim 3, wherein signals of two frequency bands which act as an image signal to each other are received simultaneously.

5. The image signal cancel-type heterodyne reception method according to any one of claims 1-4, wherein rectangular waves or sine waves whose phases are shifted by  $90^\circ$  from each other are used as the two modulating orthogonal signals which are orthogonal to each other.

6. The image signal cancel-type heterodyne reception method according to any one of claims 1-4, wherein two-valued signals having sequences  $\{1, -1, 1, -1, 1, 1, -1, -1\}$  and  $\{1, 1, -1, -1, 1, -1, 1, -1\}$  respectively are used as the two modulating orthogonal signals which are orthogonal to each other.

7. A direct conversion orthogonal frequency division multiplexing reception method comprising the steps of:

modulating a high-frequency signal modulated by orthogonal frequency division multiplexing, by using two-phase output signals of a local oscillator whose frequencies are equal to a center frequency of a receive

signal and whose phases are shifted by  $90^\circ$  from each other, to generate two-phase base-band signals;

summing a pair of modulated signals of the two-phase base-band signals which are modulated using two modulating orthogonal signals which are orthogonal to each other, to generate one synthesized signal;

amplifying the synthesized signal to generate a synthesized-signal amplifier output signal;

modulating the synthesized-signal amplifier output signal by using the modulating orthogonal signals; and

based on a result of performing Fourier transform on the modulated synthesized-signal amplifier output signal, performing demodulation against the orthogonal frequency division multiplexing.

8. A direct conversion orthogonal frequency division multiplexing reception method comprising the steps of:

modulating a high-frequency signal modulated by orthogonal frequency division multiplexing, by using two-phase output signals of a local oscillator whose frequencies are equal to a center frequency of a receive signal and whose phases are shifted by  $90^\circ$  from each other, to generate two-phase base-band signals;

summing a pair of modulated signals of the two-phase base-band signals which are modulated using two modulating

orthogonal signals which are orthogonal to each other, to generate one synthesized signal;

amplifying the synthesized signal to generate a synthesized-signal amplifier output signal; and

based on a result of performing Fourier transform on the synthesized-signal amplifier output signal, performing demodulation against the orthogonal frequency division multiplexing.

9. The direct conversion orthogonal frequency division multiplexing reception method according to claim 7 or 8, wherein three-valued signals having sequences  $\{0, 1, 0, -1\}$  and  $\{1, 0, -1, 0\}$  respectively are used as the two modulating orthogonal signals which are orthogonal to each other.